

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: John E. Stauffer

Attorney Docket No. STF-115-A

Serial No: 09/784,616

Art Unit No.: 1754

Filed: February 15, 2001

Examiner: Nguyen, N.

For: MANUFACTURE OF HYDROGEN FROM SALT & SULFURIC ACID

**DECLARATION OF HENRY C. GRIFFIN UNDER 37 C.F.R. SECTION 1.132**

I, Henry C. Griffin, hereby declare as follows:

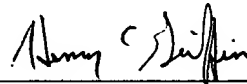
1. I am a tenured professor at the University of Michigan, Department of Chemistry, where I have taught chemistry for the past 39 years.
2. I hold a B.S. in chemistry, physics and mathematics from Davidson College, and a PhD in chemistry from the Massachusetts Institute of Technology.
3. I am familiar with both the invention as claimed in the above-captioned application, as well as the disclosure of U.S. Pat. No. 2,475,752, issued to Nachod et al. I have also reviewed and am familiar with the references cited and relied upon by the examiner in rejecting the claims of the above-captioned application, including Babor et al., Basic College Chemistry (2<sup>nd</sup> ed.).
4. I do not believe that it would have been obvious to one of ordinary skill in the art to have altered the 1:2 mole ratio of sulfuric acid to sodium chloride, respectively, as taught in Nachod et al., to a 1:1 mole ratio by

increasing the amount of sulfuric acid in order to speed up the rate of reaction, as argued by the examiner in Paper No. 4. This conclusion is premised upon the following: First, the reactions among the reactants in contact in the process of Nachod et al. are substantially instantaneous, such that no increased reaction rate would be realized by the addition of greater amounts of sulfuric acid. Second, the reactant feed of Nachod et al. is heterogenous, comprising *fluid* sulfuric acid and *solid* alkali chloride. Given that the surface area of the solid metal chloride is unchanged, the addition of greater amounts of sulfuric acid would not be expected to alter the rate of reaction.

5. While the *net* reactions of the invention of the above-captioned application and the process of Nachod et al. (i.e.,  $\text{H}_2\text{SO}_4 + 2\text{NaCl} \rightarrow 2\text{HCl} + \text{Na}_2\text{SO}_4$ ) may be the same, this comparison fails to consider the energy efficiencies of the process of the former, which energy efficiencies are *not* achieved in the Nachod et al. process. On the contrary, the effect of increasing the amount of sulfuric acid, such as claimed in the pending application, manifests itself in a favorable rate of heat transfer, as evidenced in the temperature profile of FIG. 2, attached, as well as a shift in equilibrium compositions at various points in the reaction chamber, as evidenced in FIG. 1, also attached.
6. The undersigned being hereby warned that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. Section 1001, and that such willful false statements may jeopardize

the validity of this application or any resulting registration, declares that all statements made of his knowledge are true, and that all statements made upon information and belief are believed to be true.

Signed,

A handwritten signature in black ink, appearing to read "Henry C. Griffin", is written over a horizontal line.

Henry C. Griffin, PhD

Dated: 2003 Oct 15